IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner	: Roberts P. Culbert
Group Art Unit	: 1763
Applicants	: Gregory S. Marczak et al
Serial No.	: 09/899,591
Filed	: July 5, 2001
Attorney Docket No.	: 22053.75038-001
For	: ANODIZED ALUMINUM ETCHING PROCESS AND RELATED APPARATUS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF JAMES NALEWICK UNDER 37 C.F.R. §1.132

1. I, James Nalewick, hereby declare as follows under penalty of perjury.

2. I hold B.S. degree from Saginaw Valley State University, awarded in physics and chemistry.

3. Since 1988, I have worked continually in the metal finishing industry, particularly in the field of aluminum processing. I have been employed by Lorin Industries from 1988 to present. At Lorin, I was previously Technical Manager, and am now Product Development Manager. During my sixteen year employment with Lorin in the metal finishing industry, I have worked daily with aluminum processing engineers and technicians concerning the anodizing and modification of aluminum and aluminum alloy parts, sheets and webs. Since 1997, I have also served as Chairman of the Technical and Standard Committee for the Aluminum Anodizers Council (an industry trade group for aluminum anodizing companies).

4. I have reviewed U.S. Patent 4,624,752 to Arrowsmith et al (the "Arrowsmith Patent") in view of the Arrowsmith article, "The enhancement of adhesive joint strength by extending the surface of anodized aluminum" (the "Arrowsmith Publication"), U.S. Patent 4,235,682 to Schneeberger et al, and U.S. Patent 3,671,333 to Mosier.

5. Among the aluminum processing techniques with which I was familiar before the filing date of the above-identified application were the techniques of the type described in the references listed in paragraph 4 above.

6. I have reviewed the Office Action in the above-identified application, which contains the following statement:

> The Arrowsmith Patent does not teach application of the process to a continuous web of aluminum, however this step would have been obvious to one of ordinary skill in the art at the time of invention in order to provide commercial aluminum (Col. 4, lines 15-18) with a surface that will strongly adhere to coatings (Col. 1, Lines 15-24).

That statement is incorrect in view of the state of aluminum processing art as of the filing date of the above-identified application. First, one skilled in the art *would not* have modified the piece-part processing of Arrowsmith to accommodate continuous web processing because to do so would change the principles of operation of the Arrowsmith Patent. For example, the Arrowsmith Patent emphasizes that:

> The main feature of this invention is a controlled dip in a solution containing phosphoric acid in order to develop an outer surface of the alumina with a tailored topography for maximum reinforcement of the subsequent adhesive bond and redistribution of a load on a stress joint over a relatively thick interfacial region of alumina and adhesive. At the same time the inner part of the alumina remains dense and corrosion resistant, and furthermore the phosphoric acid renders the alumina hydration resistant. To produce the requisite surface topography, the processing parameters for both the sulfuric acid anodizing and the phosphoric acid dip have to be carefully selected.

Col. 3, Lns. 37-51. Thus, Arrowsmith dips an entire part into phosphoric acid under carefully selected conditions--dwell times, temperature and concentration--that are specific and unique to

piece-part dipping. Col. 4, Lns. 52-58. These piece-part conditions cannot be relied upon for treating a continuous web of aluminum, which requires substantially different operating parameters due to the differences in dwell time in piece-part processing tank and the rapid application of material to a continuous web in continuous web processing. Continuous web processing is analogous to firing at a running target with a specific bullet, whereas piece-part dipping is analogous to firing at a stationary target point blank. Accordingly, one skilled in the art would have been deterred from, not motivated to, modify the Arrowsmith Patent to process a continuous web of aluminum.

Second, there was no motivation in the art as of the filing date of the application to modify the Arrowsmith Patent piece-part aluminum processing to a continuous web. Again, the problem facing continuous web processing was transferring a specific concentration of material at a specific temperature, at a specific pH for a specific amount of time to a web. These processors would not have looked to piece-part processing because piece-part processing is forgiving enough to allow variations in these operating parameters.

Accordingly, there was no reason apparent to one skilled in the art as the filing date of the application to modify the piece-part dipping process of the Arrowsmith Patent to process a continuous web of aluminum.

7. I have also reviewed the following statement in the Office Action:

> It would therefore have been obvious to apply the method of Arrowsmith to one side of an aluminum sheet or web in order to provide commercial aluminum for such applications [i.e. metallic foil applications].

This statement also is incorrect in view of the state of the aluminum processing art as the filing date of the application. First, one skilled in the art *would not* have modified Arrowsmith to selectively etch one side of an aluminum sheet or web for the reasons noted in paragraph 6 above, and additionally, because to do so would destroy the operability and utility of the Arrowsmith Patent process. The Arrowsmith Patent relies on the controlled submersion of an anodized aluminum part in phosphoric acid 1) to modify the outer surface of the anodized aluminum part so that the surface bonds well to adhesives, and 2) to ensure that the inner portions of the aluminum part remain dense, corrosion resistant and hydration resistant. Col. 3, Lns. 36-51. Thus, in Arrowsmith, *all* of outer surfaces of the anodized part are necessarily etched with the phosphoric acid. Again, this is to prevent hydration of the aluminum by water which may reduce the strength of the joint and lead to premature joint failure. Col. 1, Lns. 61-63. Accordingly, one skilled in the art would and have been deterred from, not motivated to, etch *only one side* of an aluminum part of Arrowsmith.

Second, there is no motivation in the art as of the filing date of the application to apply the processing techniques of Arrowsmith's piece-part processing to aluminum sheet or web--let alone one side of an aluminum sheet or web. Again, the techniques involved in continuously processing webs versus dipping parts by piece are significantly different, and require very different operating parameters. Furthermore, the phosphoric acid processing of the Arrowsmith Patent is very aggressive--so much so that it continues to dissolve the alumina after cessation of anodizing current encountered in commercial anodizing. Col. 2, Lns. 29-34. Accordingly, one skilled in the art as of the filing date of the application would not have

attempted to combine the Arrowsmith technology with metal foil technology (relied on in the Office Action for one-sided treatment of metal) because of the aggressive nature of phosphoric acid anodizing and its potential to completely eat through thin metallic foils thereby destroying the product. Accordingly, there was no reason apparent to one skilled in the art as of the filing date of the application to modify Arrowsmith to treat only one side of a sheet or web--even in view of metallic foils.

8. I have further reviewed the following statement in the Office Action:

> Arrowsmith does not teach the steps of coloring and sealing the anodic layer before the etching (roughening) step. However the step of sealing an anodic layer after formation is notoriously old and well known in the art of forming anodized aluminum surfaces. For example, U.S. Patent 3,671,333 to Mosier teaches that it is conventional in the art to seal [an] anodized aluminum after it is removed from the anodizing bath. (Col. 3, Lines 26-28) and (Col. 5, Lines 74-75) U.S. Patent 4,235,682 to Schneeberger et al. . . .It would have been obvious to one of ordinary skill in the art at the time of invention to color the anodized surface [of the Arrowsmith Patent] before the step of sealing in order to provide a decorative finish that is entrapped securely within the oxide as taught by Schneeberger.

The above statements are incorrect in view of the state of the aluminum processing art as of the filing date of the application. First, one skilled in the art *would not* have sealed the anodized coating of the Arrowsmith Patent with Mosier's seal because there was no motivation in the art as of the filing date of the application to do so. The Arrowsmith Patent teaches *hard anodizing* the aluminum with sulfuric acid to produce a thick layer which is environmentally stable and unaffected by the presence of water, of a dense-packed, thick-walled anodic coating (alumina). Col. 2, Lns. 59-63. Those skilled in the art as of the filing date of the application believed that

such hard anodized coatings did not typically require a sealing layer because such a layer added little additional protection and/or stability to the hard anodized layer. Moreover, those skilled in the art as of the filing date of the application believed that it would have been counterproductive to first seal an anodizing layer and then remove both that sealed layer and a portion of the anodic layer because to do so would add additional processing steps and would simply remove what was previously added (i.e., the sealing layer).

Likewise, there would have been no motivation in the art as of the filing date of the application to color (taught in Schneeberger) before the etching step as suggested in the Office Action, because the etch would remove the coloring entirely, therefore rendering that step useless. To etch away the color previously added would appear a waste of resources to one of skill in the art.

Dated: July 20th, 2004

James Nalewick